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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,195	01/13/2004	Osama Khouri	854163.412	2310

38106 7590 05/17/2005

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EXAMINER

PHAM, THANHHA S

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/756,195

Applicant(s)

KHOURI ET AL.

Examiner

Thanhha Pham

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 9-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 AND 16-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/16/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to Applicant's Election 02/04/2005.

Election/Restrictions

1. Claims 9-15 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 02/24/2005
2. Applicant's election with traverse of claims 1-8 and 16-22 in the reply filed on 02/24/2005 is acknowledged. The traversal is on the ground(s) that restriction is not proper since Examiner improperly compared device of independent claim 1 with the process dependent claim 11 to shows distinctness between the two group of inventions a group of product invention I (claims 1-8 & 16-12) and a group of method invention II (claims 9-15). This is not found persuasive because claim 1 belongs to the group of product invention I while claim 11 belongs the group of method invention II. Examiner entitles to compare the claim 1 to claim 11 to shows distinctness between the two groups of invention. As being mentioned in previous Office Action of Restriction Requirement, because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

The requirement is still deemed proper and is therefore made FINAL.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in European on 01/15/2003. It is noted, however, that applicant has not filed a certified copy of the 03425016.7 application as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

► With respect to claim 1,

lines 8-10, "wherein said first conducting region has a strip-like shape having a longitudinal direction delimited by and end phase extending transversely to said upper surface and forming a contact area with said second conducting region" renders the claim indefinite. Limitation of "a strip-like shape" renders the claim indefinite since it is unclear what applicant intended to cover by the recitation of "a strip-like shape" (see MPEP2173.05(b)). In addition, it is not clear what forming a contact area – "a strip-like shape" or "an end phase extending transversely to said upper surface".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, 6 and 16-18, as being best understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Wicker [US 2004/0113181].

► With respect to claim 1, Wicker (fig. 14, text [0001]-[0075]) discloses the claimed electronic semiconductor device comprising:

a body of semiconductor material (620/600) having an upper surface;
a dielectric layer (180) extending on top of said body; and
a contact structure in said dielectric layer, said contact structure comprising a first conducting region (130 & 140) and a second conducting region (120), said second conducting region being of chalcogenic material and being in electric contact with said first conducting region (text [0048]-[0051]);

wherein said first conducting region (130 & 140) has a strip shape having a longitudinal direction delimited by an end face extending transversely to said upper surface, said end face (vertical planes of first conducting region 130 & 140) forming a contact area with said second conducting region (120, see figure 14).

► With respect to claim 2, Wicker (figure 14) shows said first conducting region(130 & 140) extends in a direction parallel to said upper surface.

► With respect to claim 3, Wicker (fig. 14) shows said end face is perpendicular to said upper surface. *****Notice:** *It is noted that process limitation of "within process tolerances" does not carry weight in a claim drawn to structure because distinct structure is not necessarily produced. See In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985). In addition, a "product by process" limitation is directed to the product per se, no matter how actually made, in re Hirao, 190 USPQ 15 and 17 (footnote 3). See also In re Brown, 173 USPQ 685 (CCPA 1972); In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90; and In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); all of which made clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product by a new method is not patentable as a product, whether claimed in "product by process" claims or not. "Even though product -by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).*

► With respect to claim 6, Wicker (figure 14, text [0001]-[0004] & [0048]-[0066]) discloses wherein the contact structure is part of a PCM storage element of a PCM memory cell that further includes a selection element (651 or 652, text [0064]), said PCM storage element being formed by a heater element including said first conducting region (130 & 140, text [0050]) and a storage region comprising said second conducting region (120, text [0053]).

► With respect to claim 16, Wicker (fig. 14, text [0001]-[0075]) discloses the claimed electronic PCM device comprising:

a body of semiconductor material (620/600) having a lower surface;

a dielectric layer (180) extending on top of said body; and

a PMC memory cell that includes a PCM storage element (120/130/140) formed in the dielectric layer and a selection element (651 or 652, text [0064]), the PCM storage element being formed by a heater element (130 & 140, text [0050]), wherein the heater element has an end face extending transversely to the lower surface and forming a contact area with the storage region (120).

► With respect to claim 17, Wicker (figure 14) shows the heater element (130 & 140) extends in a direction parallel to the lower surface.

► With respect to claim 18 Wicker (fig. 14) shows said end face is perpendicular to said upper surface. *****Notice:** *It is noted that process limitation of "within process tolerances" does not carry weight in a claim drawn to structure because distinct structure is not necessarily produced. See In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985). In addition, a "product by process" limitation is directed to the product per se, no matter how actually made, in re Hirao, 190 USPQ 15 and 17 (footnote 3). See also In re Brown, 173 USPQ 685 (CCPA 1972); In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90; and In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); all of which made clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product by a new method is not patentable as a product, whether claimed in "product by process" claims or not. "Even though product-by-[] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).*

6. Claims 1-3, 6-8, 16-18, 21-22, as being best understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Ha et al. [2004/0166604].

*****Notice:** *Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.*

► With respect to claim 1, Ha et al. (fig. 6-7, text [0001]-[0072]) discloses the claimed electronic semiconductor device comprising:

a body of semiconductor material (51) having an upper surface;
a dielectric layer (63/69/71/73/101/109) extending on top of said body; and
a contact structure in said dielectric layer, said contact structure comprising a first conducting region (79a' & 79b') and a second conducting region (105a/105p'/105p"), said second conducting region being of chalcogenic material (phase changeable material, GST) and being in electric contact with said first conducting region;

wherein said first conducting region (79a' & 79b') has a strip shape having a longitudinal direction delimited by an end face extending transversely to said upper surface, said end face (vertical planes of first conducting region 79a' & 79b') forming a contact area with said second conducting region.

► With respect to claim 2, Ha et al. (figure 7) shows said first conducting region (79a' & 79b') extends in a direction parallel to said upper surface.

► With respect to claim 3, Ha et al. (fig. 7) shows said end face is perpendicular to said upper surface. *****Notice:** *It is noted that process limitation of "within process tolerances" does not carry weight in a claim drawn to structure because distinct structure is not necessarily produced. See In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985). In addition, a "product by process" limitation is directed to the product per se, no matter how actually made, in re Hirao, 190 USPQ 15 and 17 (footnote*

3). See also *In re Brown*, 173 USPQ 685 (CCPA 1972); *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324 (CCPA 1974); *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90; and *In re Marosi et al.*, 218 USPQ 289 (Fed. Cir. 1983); all of which made clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product by a new method is not patentable as a product, whether claimed in "product by process" claims or not. "Even though product-by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

► With respect to claim 4, Ha et al. (combination of fig. 6 & 7) shows said end face has a generally rectangular shape having a height and a width.

► With respect to claim 6, Ha et al. (figure 7) discloses wherein the contact structure is part of a PCM storage element of a PCM memory cell that further includes a selection element (61s', 61d, 61s"), said PCM storage element being formed by a heater element including said first conducting region (79a' & 79b': bottom electrode 79a' & 7b' would function as a heater element to heat the storage region of 105p' & 105p" when the memory device is operated, text [0005]) and a storage region comprising said second conducting region (105a/105p'/105p").

► With respect to claim 7, Ha et al. (fig. 7) shows said selection element (16s' & 61s") is formed in said body (51), a lower electrode (77p' and 77p") extending in said dielectric layer between said selection element and said first conducting region, an upper electrode (113) extends in said dielectric layer and forms a bit line.

► With respect to claim 8, Ha et al. (fig. 7) shows the second conducting region (105a/105p"/105p') has a reduced area portion in contact with said first conducting

regions (79a' & 79b') and an upper enlarged portion extending on top of said reduced area portion and in contact with said upper electrode.

► With respect to claim 16, Ha et al. (fig. 6-7, text [0001]-[0072]) discloses the claimed electronic PCM device comprising:

a body of semiconductor material (51) having a lower surface;
a dielectric layer (63/69/71/73/101) extending on top of said body; and
a PMC memory cell that includes a PCM storage element (79a'/79b', 105a/105p'/105p") formed in the dielectric layer and a selection element (61s', 61d, 61s"), the PCM storage element being formed by a heater element (79a'/79b': bottom electrode 79a' & 7b' would function as a heater element to heat the storage region of 105p' & 105p" when the memory device is operated, text [0005]), wherein the heater element has an end face extending transversely to the lower surface and forming a contact area with the storage region (105a/105p'/105p").

► With respect to claim 17, Ha et al. (figure 7) shows the heater element (79a'/79b') extends in a direction parallel to the lower surface.

► With respect to claim 18, Ha et al. (fig. 7) shows said end face is perpendicular to said lower surface. *****Notice:** *It is noted that process limitation of "within process tolerances" does not carry weight in a claim drawn to structure because distinct structure is not necessarily produced. See In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985). In addition, a "product by process" limitation is directed to the product per se, no matter how actually made, in re Hirao, 190 USPQ 15 and 17 (footnote 3). See also In re Brown, 173 USPQ 685 (CCPA 1972); In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90; and In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); all of which made clear that it is the patentability of the final product*

per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product by a new method is not patentable as a product, whether claimed in "product by process" claims or not. "Even though product -by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

- ▶ With respect to claim 19, Ha et al. (combination of figure 6 & 7) shows the end face has a generally rectangular shape having a height and a width.
- ▶ With respect to claim 21, Ha et al. (fig. 7) shows said selection element (16s' & 61s") is formed in said body (51), a lower electrode (77p' and 77p") extending in said dielectric layer between said selection element and the heating element (79a' & 79b'), and an upper electrode (113) extends in said dielectric layer and forms a bit line.
- ▶ With respect to claim 22, Ha et al. (fig. 7) shows the second conducting region (105a/105p"/105p') has a reduced area portion in contact with the heater elements (79a' & 79b') and an upper enlarged portion extending on top of said reduced area portion and in contact with said upper electrode.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. [US 2004/0166604].

With respect to claim 5 and 20, the claimed range dimension of end face is considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in *In re Aller* 105 USPQ233, 255 (CCPA 1955), the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

9. Claims 4-5 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wicker et al [US 2004/0113181] in view of Lowery et al. [WO 0209206].

► With respect to claim 4 and 19, Wicker et al substantially discloses the claimed device including the end face transversely to the lower surface and forming a contact area with the storage region. Wicker et al is silent about the shape of the end face of a generally rectangular shape having a height and a width.

However, the claimed shape is obvious for those skilled in the art since the court held that the configuration of the claimed container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant. See *In re Dailey*, 357 F. 2d 669, 149 USPQ 47 (CCPA 1966).

Moreover, Lowery et al. (fig 9D) shows an end face of the generally rectangular shape having the height and the width for a contact area to the first conducting region of chalcogenic material of the storage region.

Therefore, at the time of invention, it would have been obvious for those skilled in the art, in view of Lowery et al, to select the claimed shaped of the end face of rectangular shape for the device of Wicker to provide the contact area to the first conducting region of chalcogenic material of the storage region for operating the memory device.

► With respect to claims 5 and 20, the claimed range dimension of end face is considered to involve routine optimization while has been held to be within the level of

ordinary skill in the art. See *In re Aller* 105 USPQ233, 255 (CCPA 1955); *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

10. Claims 7-8 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wicker [US 2004/0113181] in view of Bez et al. [US 2003/0219924]

Wicker et al. substantially discloses the claimed device including the selection element (651 & 652) in the body (620/600), a lower electrode (670 or 675) in the dielectric layer between the selection element and the first conductive region/heater element (130/140) wherein the second conducting region/storage region (120) has a reduced area portion in contact with the first conducting region/heater element (130/140) and an upper enlarged portion extending on top of the reduced area portion.

Wicker et al. fails to shows an upper electrode extends in the dielectric layer on the second conducting region/the storage region and forms a bit line wherein the enlarged portion in contact with the upper electrode.

However, Bez et al (figs 22 & 25, text [0060]) teaches the upper electrode (87/86) extending in the dielectric layer (90/91) on the second conducting region/the storage region(85) and forms the bit line wherein the enlarged portion of the second conducting region/the storage region (85) in contact with the upper electrode.

Therefore, at the time of invention, it would have been modify the device of Wicker by using the upper electrode as being claimed, per taught by Bez et al. to form the bit line for the memory device to provide appropriate conductive/signal path for memory device operation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thanhha Pham
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Patent Examining Group 2800